

**CLAIMS**

1. A gas turbine engine comprising an electrical machine,  
the electrical machine comprises a rotating part and a  
5 fixed part, the rotating part is provided by the rotating  
blade ring, the rotating blade ring comprises a plurality  
of blades, each blade having an extremity of magnetically  
permeable material, the fixed part comprises a casing  
defining an array of circumferentially spaced slots each  
10 slot comprising a stator and each stator comprises  
excitation coils; wherein there is provided an unequal  
number of blades and stators, and the coils are arranged  
into at least two phases for excitation and each coil  
extends from a slot of the corresponding phase, past a slot  
15 of the other phase, to a further slot of the same  
corresponding phase in order to complete a loop; the blades  
and the stators are arranged to alternate into and out of  
phase on rotation of the rotating part.
2. A gas turbine engine comprising as claimed in claim 1  
20 wherein the coils are arranged into three phases for  
excitation.
3. An engine according to claim 1, wherein the extremity  
is located beyond those parts of the blades which provide  
the aerodynamic function of the blades.
- 25 4. An engine according to claim 1, wherein the rotating  
part is provided at the radially outward extremity of the  
blades.
5. An engine according to claim 1, wherein the blades are  
shrouded, the shrouding separating those parts of the  
30 blades which provide the aerodynamic function, from those  
parts which provide the rotating part of the electrical  
machine.
6. An engine according to claim 5, wherein the blades are  
shrouded at the radially outer end of those parts which  
35 provide the aerodynamic function, and in that the  
electrical machine is provided substantially wholly outside

the shrouded region.

7. An engine according to claim 1 wherein the blades are unshrouded.

8. An engine according to claim 1, wherein the blades are  
5 unshrouded and have parts which provide the aerodynamic function of the blades, the aerodynamic parts further providing a part of the electrical machine.

9. An engine according to claim 1 wherein the fixed part of the machine comprise coils.

10 10. An engine according to claim 1 wherein the rotating part of the machine comprises any one of a group comprising magnetically permeable material or permanently magnetised material.

11. An engine according to claim 1 wherein the parts of  
15 the machine operate to form any one of a group comprising a permanent magnet machine, a transverse flux machine or a switched reluctance machine.

12. An engine according to claim 1 wherein the blades form any one of a group comprising a compressor or turbine of  
20 the engine.

13. An engine according to claim 1 wherein the engine is a multi-shaft engine.

14. An engine according to claim 1 wherein the fixed part of the machine provides at least part of the containment  
25 system for the blades.

15. A gas turbine engine comprising an electrical machine, the electrical machine comprises a rotating part and a fixed part, the rotating part is provided by the rotating blade ring, the rotating blade ring comprises a plurality  
30 of blades, each blade having an extremity of magnetically permeable material, the fixed part comprises a casing defining an array of circumferentially spaced slots each slot comprising a stator and each stator comprises excitation coils; wherein there is provided an unequal  
35 number of blades and stators, and the coils are arranged into at least two phases for excitation and each coil

extends from a slot of the corresponding phase, past a slot of the other phase, to a further slot of the same corresponding phase in order to complete a loop; thereby providing electrical energy to the coils produces a  
5 magnetic flux path capable of rotating the rotor.